

**IN THE UNITED STATES  
PATENT AND TRADEMARK  
OFFICE**

**APPELLANTS' BRIEF UNDER 37 C.F.R. § 41.37**

In re the Application of: **Osgood et al.**  
Application No.: **09/586,858**  
Filed: **June 5, 2000**  
Group Art Unit: **1743**  
Examiner: **Siefke**  
For: **METHOD AND APPARATUS FOR WASHING AND  
DRYING PINS IN MICROARRAY SPOTTING  
INSTRUMENTS**  
Attorney Docket No.: **111453.125**

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**I. REAL PARTY IN INTEREST**

The real party in interest is PerkinElmer LAS, Inc., the assignee of record.

**II. RELATED APPEALS AND INTERFERENCES**

There are no pending appeals or interferences that would directly or indirectly affect or have a bearing on the Board's decision in this appeal.

**III. STATUS OF CLAIMS**

Claims 5 and 19-101 have been cancelled. The remaining claims in the application, claims 1-4, 6-18 and 102-133, have been rejected and are being appealed herein.

**IV. STATUS OF AMENDMENTS**

Claims 1-4, 6-18 and 102-133 were rejected in a final office action issued March 17, 2005. No amendments were filed after the final office action.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

One embodiment of the invention is directed to a method for washing and drying a pin of a microarray spotting instrument. In accordance with the method, the pin is moved to a given position, and washed while in the given position. (Specification at page 12, lines 6-9). More particularly, the pin is washed by impinging a fluid depositing tip of the pin with at least one stream of wash fluid. (Specification at page 13, lines 14-25). The pin is then dried without substantially moving the pin from the given position. (Specification at page 12, lines 6-9).

Another embodiment of the invention is also directed to a method of washing and drying a pin of a microarray spotting instrument. The pin is moved to a given position, and washed while in the given position. (Specification at page 12, lines 6-9). The pin is then dried without substantially moving the pin from the given position by flowing air past the pin. (Specification at page 16, lines 22-27). The air that is flowed past the pin is of lower humidity than air in an enclosure containing the spotting instrument. The lower humidity air is introduced into the enclosure from outside the enclosure. (Specification at page 19, lines 5-14).

A further embodiment of the invention is also directed to a method of washing and drying a pin of a microarray spotting instrument. This method features moving the pin to a given

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position, and washing the pin while in the given position. (Specification at page 12, lines 6-9). The pin is washed with a wash fluid while a vacuum is applied to remove wash fluid previously applied to the pin. (Specification at page 13, lines 8-13). The pin is then dried without substantially moving the pin from the given position. The pin is dried by applying a vacuum to draw air past the pin. (Specification at page 16, lines 22-27).

The claims are generally directed to integrated methods of washing pins in microarray spotting instruments. The methods "allow pins to be washed and dried while substantially in one position, i.e., without requiring significant movement of a printhead holding the pins between washing and drying cycles" (p. 12, lines 6-9). Claims 1, 102, and 118 are independent.

Claim 1 is directed to a method of washing and drying a pin without substantially moving the pin from a given position, including washing the pin by impinging a fluid depositing tip of the pin with at least one stream of wash fluid. The method includes the following limitations, support for which in the specification is indicated parenthetically, noting that the cited embodiments are intended simply to provide an illustrative example of the claimed subject matter:

moving said pin to a given position (p. 12, lines 6-9);  
washing said pin while in said given position by impinging a fluid depositing tip of said pin with at least one stream of wash fluid (p. 12, lines 6-9, p. 13, lines 14-25); and  
drying said pin without substantially moving said pin from said given position (p. 12, lines 6-9).

Claim 102 is directed to a method of washing and drying a pin without substantially moving the pin from a given position, including drying the pin by flowing air past the pin. The method includes the following limitations, support for which in the specification is indicated parenthetically, noting that the cited embodiments are intended simply to provide an illustrative example of the claimed subject matter:

moving said pin to a given position (p. 12, lines 6-9);  
washing said pin while in said given position (p. 12, lines 6-9);

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drying said pin without substantially moving said pin from said given position by flowing air past said pin (p. 16, lines 22-27),

said air being of lower humidity than air in an enclosure containing the spotting instrument, said air having lower humidity being introduced to said enclosure from outside said enclosure (p. 19, lines 5-14).

Claim 118 is directed to a method of washing and drying a pin without substantially moving the pin from a given position, including washing the pin while applying a vacuum to remove wash fluid previously applied to the pin, and further including drying the pin by applying a vacuum to draw air past the pin. The method includes the following limitations, support for which in the specification is indicated parenthetically, noting that the cited embodiments are intended simply to provide an illustrative example of the claimed subject matter:

moving said pin to a given position (p. 12, lines 6-9);

washing said pin while in said given position with a wash fluid while applying a vacuum to remove wash fluid previously applied to said pin (p. 13, lines 8-13);

drying said pin without substantially moving said pin from said given position (p. 12, lines 6-9),

said pin being dried by applying a vacuum to draw air past said pin (p. 16, lines 22-27).

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

- A. Whether claims 1-4 and 6-18 are anticipated under 35 U.S.C. § 102(a) by WO 99/36760 (the '760 PCT reference), and under 35 U.S.C. § 102(e) by U.S. Patent No. 6,428,752 issued to Montagu (the Montagu patent).
- B. Whether claims 102-117 are anticipated under 35 U.S.C. § 102(a) by the '760 PCT reference, and under 35 U.S.C. § 102(e) by the Montagu patent.
- C. Whether claims 118-133 are anticipated under 35 U.S.C. § 102(a) by the '760 PCT reference, and under 35 U.S.C. § 102(e) by the Montagu patent.

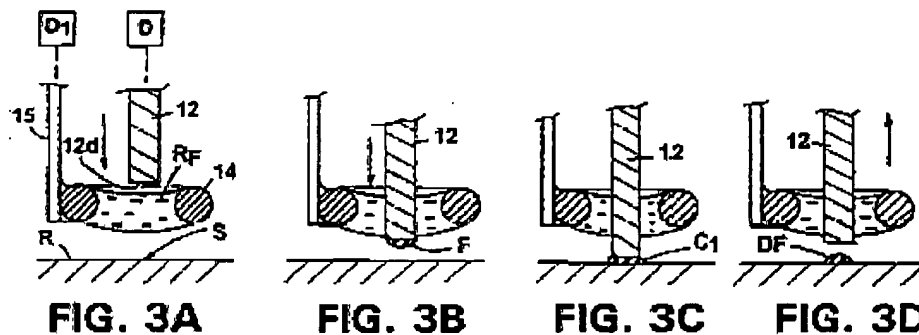
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## VII. ARGUMENTS

### A. Claims 1-4 and 6-18 are not anticipated by either the '760 reference or the Montagu patent.

Independent claim 1 of the present application is directed to a method of washing and drying a pin of a microarray spotting instrument. The method includes the steps of moving the pin to a given position, washing the pin while in the given position, and drying the pin without substantially moving the pin from the given position. The claim specifies that the pin is washed by impinging the fluid depositing tip of the pin with at least one stream of wash fluid.

The Examiner asserts that claim 1 is anticipated by the '760 and Montagu references. These references are related and are cited by the Examiner for essentially the same disclosure. Both references disclose a spotting instrument having a pin and supply ring mechanism used for depositing fluid dots in a microarray as shown in Figs. 3A-3D of the Montagu patent (reproduced below) and in Figs. 9A-9D of the '760 reference.



As shown in Figures 3A-3D, the pin and supply ring mechanism includes a pin 12 having a tip 12d that can be moved through a supply ring 14. During use, the supply ring is immersed in the well of a supply plate, and fluid  $R_F$  is retained in the supply ring 14. The tip 12d of the pin 12, which has a sharp rim indicated by reference number 12f (shown in Figure 2A of the Montagu patent), is moved through the ring 14 to pick up some of the fluid in the ring and to deposit the fluid.

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It is significant to note that the references consider the *tip* of the pin to be the end point of the pin and shown in several figures by reference number 12d where the sharp rim 12f of the pin is located.<sup>1</sup>

A cleaning station for cleaning the pin and supply ring mechanism is shown in the cross-sectional view of Fig. 7 of Montagu (reproduced below) and Fig. 9G of the '760 reference. As shown, the pin and supply ring mechanism is placed within an annular nozzle 200. The annular nozzle 200 transmits fluid to the pin 12 and the supply ring 14 in order to wash the pin and supply ring.

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<sup>1</sup> See, e.g., the Montagu reference: Figs. 3A-3D, 4, 4A, and 7; and col. 9, lines 33-34 ("Deposit pin 12, having a sharp rim 12F at its tip ...") and 45-46 and col. 13, lines 33-34 ("pin tip 12d"). See also, the '760 reference: Figs. 1, 2A, 2B, 3, 9, 9A-9D, 9G and 20; and page 24, lines 29-30 ("Tip 12d has sharp rim 12f..."), page 30, lines 1-2, and page 32, lines 30-34 ("deposit pin 12 comprises a relatively large body 12a and a lower portion 12b of reduced dimension that leads to deposit tip 12d having sharp rim 12f").

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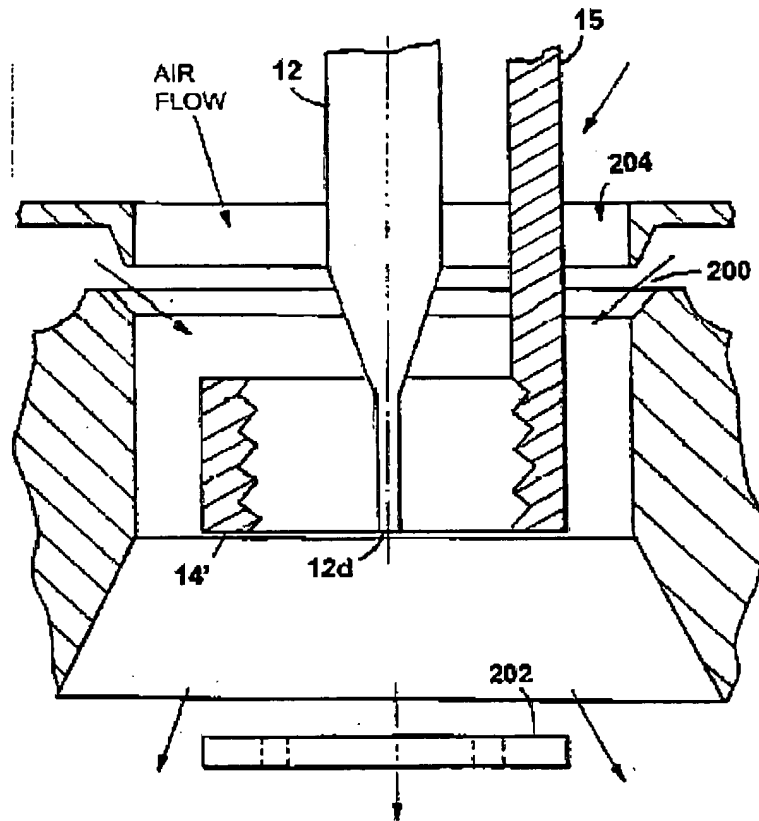


FIG. 7

Claim 1 of the present application is not anticipated by either the '760 or Montagu references because neither reference discloses (or even suggests) "washing said pin ... by impinging a fluid depositing tip of said pin with at least one stream of wash fluid." As described above, Montagu and the '760 reference disclose placing the pin and supply ring mechanism in the annular nozzle and directing fluid at the pin and supply ring. However, the references only disclose directing fluid at the body of the pin, not at the tip of the pin. The fluid directed at the body of the pin may run down the length of the pin toward the tip, but fluid from the nozzle does not impinge the fluid depositing tip of the pin, as specified in claim 1. For example, the Montagu patent states in col. 2, lines 34-39, that there is "a cleaning station [that] comprises a fluid jet arranged to blow down along the length of the deposit device toward its drop depositing end." (emphasis added). Thus, instead of impinging the fluid depositing tip of the pin as



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specified in claim 1, the cited references only disclose flowing fluid along the length of the device in a direction towards the tip. As noted above, Montagu and '760 references identify the tip of the pin 12 by reference numeral 12d and indicate that tip has "a sharp rim 12F." (Montagu, col. 9, lines 33-36). There is simply no impingement, i.e., striking, of this tip of the pin by wash fluid in Montagu or the '760 reference.

Additionally, Montagu and the '760 references actually teach away from impinging the pin tip with wash fluid. It appears that this is not even possible in the wash station disclosed in the references because the presence of the supply ring as shown in Fig. 7 (reproduced above) would prevent any impingement of the pin tip with fluid from the annular nozzle. In particular, the location of the supply ring 14' between the nozzle 200 and the pin tip 12d would appear to block fluid from the nozzle 200 from impinging, i.e., directly striking, the fluid depositing tip of the pin 12d. The Montagu and '760 reference wash stations are designed to wash both the pin and the supply ring, and fluid from the nozzle would apparently flow through the supply ring and flow down the length of the pin toward the pin tip 12d. Fluid from the nozzle cannot simply bypass the ring and directly impinge the pin tip. The cited references therefore teach away from impinging the pin tip with wash fluid.

Therefore, because Montagu and the '760 references do not disclose or suggest "washing said pin ... by impinging a *fluid depositing tip* of said pin with at least one stream of wash fluid" as specified in independent claim 1, the Examiner's rejection of claim 1 should be reversed. Claims 2-4 and 6-18 depend from claim 1 and are therefore also allowable over the cited references.

**B. Claims 102-117 are not anticipated by either the '760 reference or the Montagu patent.**

Independent claim 102 is directed to a method for washing and drying a pin of a microarray spotting instrument. The method features drying the pin by flowing air past the pin with the air being of a lower humidity than air in an enclosure containing the spotting instrument.

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The lower humidity air is introduced into the enclosure from outside the enclosure.<sup>2</sup> Claim 102 is not anticipated by the cited Montagu or '760 references because the references only teach that air used for drying pins can be heated. There is no teaching or suggestion that the air used for drying be of a lower humidity and be introduced into an enclosure containing the spotting instrument.

None of the office actions issued by the Examiner explain how the cited references disclose incoming air (much less incoming air of lower humidity) being introduced into an enclosure containing the spotting instrument. Montagu discloses an enclosure around the arrayer as shown in Fig. 6 of the reference (reproduced below).<sup>3</sup>

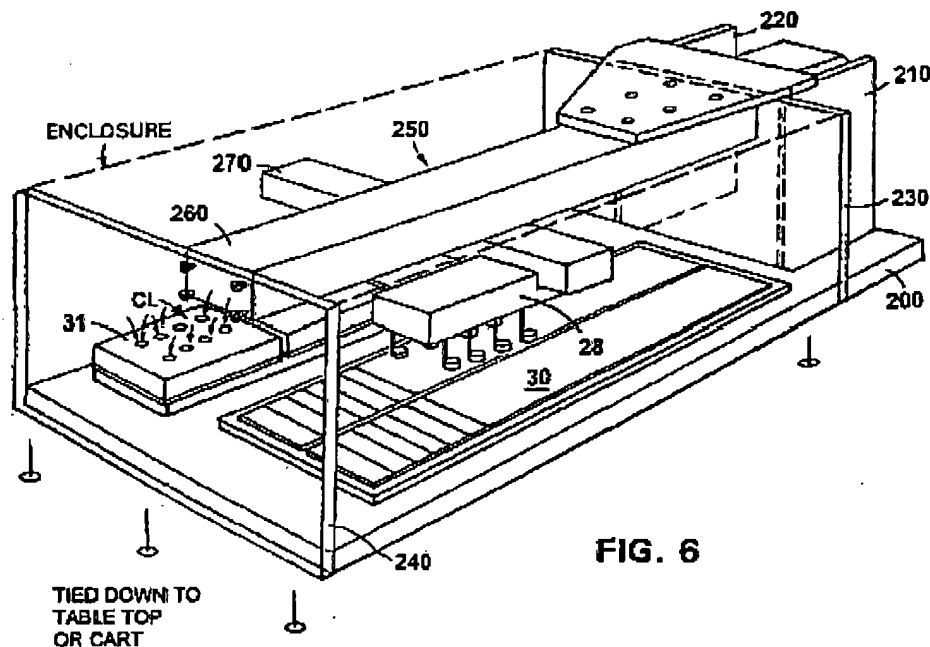


FIG. 6

This enclosure is designed to provide a controlled spotting environment to avoid contamination. (Montagu, col. 15, lines 22-31). The reference does not disclose or suggest

<sup>2</sup> As described in the specification of the present application, e.g., on page 19, lines 5-11, the environment inside the microarray spotter enclosure generally has a controlled humidity. The vacuum drying process is made quicker and more effective by using air for drying that is introduced into the enclosure and that is of lower humidity than air within the enclosure.

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introducing air for drying pins into the enclosure. In fact, the reference teaches away from introducing air into the enclosure by stating that the enclosure is used to provide a controlled environment.

Thus, the cited references do not disclose or suggest “drying said pin ... by flowing air past said pin, said air being of lower humidity than air in an enclosure containing the spotting instrument, said air having lower humidity being introduced into said enclosure from outside said enclosure” as specified in independent claim 102. The rejection of independent claim 102 should therefore be reversed. Claims 103-117 depend on claim 102, and are therefore also allowable over the cited references.

**C. Claims 118-133 are not anticipated by either the ‘760 reference or the Montagu patent.**

Independent claim 118 is directed to a method of washing and drying a pin of a microarray spotting instrument. The pin is washed with a wash fluid while a vacuum is applied to remove wash fluid previously applied to the pin. The pin is dried by applying a vacuum to draw air past the pin.

The claimed method is neither disclosed, nor suggested by the cited references. The cited ‘760 and Montagu references disclose washing and drying a pin using the cleaning station shown in Fig. 7 of the Montagu patent (reproduced on page 4 of this brief) and Fig. 9G of the ‘760 reference. The references teach using the annular nozzle for discharging compressed air from the nozzle for drying the pin. The references also teach use of a trap associated with a vacuum pump having a filter 202 to intercept removed material. (col. 10, lines 12-22 of the Montagu patent).

The Examiner is apparently taking the position that the step of drying the pin by applying a vacuum to draw air past the pin is taught by the use of a vacuum pump in the cited references. However, the references only disclose that a trap is provided for collecting fluid from the nozzle, and that “[t]he trap may be associated with a vacuum pump.” Thus, the references teach that fluid is collected in the trap, and presumably can thereafter be removed from the trap using the

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<sup>3</sup> The ‘760 reference includes a similar figure (Fig. 25) that does not appear to have an enclosure.

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vacuum pump. The cited '760 and Montagu references do not disclose or suggest using the vacuum to dry the pin by drawing air past the pin. The references only teach drying the pin by discharging compressed air from the nozzle to the pin.

The Examiner only states in the final office action that Montagu teaches that "[t]he purpose of the vacuum pump is to create a vacuum so that when a pin is washed the vacuum removes the wash fluid previously applied to the pin. (claim 1) Drying the pin is accomplished by an air current from the nozzle, supplemented by induced air flow 2% (col. 10, lines 11-34)." The final office action, therefore, fails to offer any explanation as to how the references could be said to disclose drying a pin by applying a vacuum to draw air past the pin.

Because the Montagu and '760 references fail to disclose or suggest "drying said pin ... by applying a vacuum to draw air past said pin" as specified in independent claim 118, the rejection of claim 118 should be reversed. Claims 119-133 depend on claim 118 and are therefore also allowable over the cited references.

#### **VIII. EARLIER SUBMISSIONS**

This Appellants Brief incorporates material originally submitted December 28, 2005, as well as material submitted in Appellants' Responses to Notification of Non-Compliant Appeal Briefs dated August 29, 2006 and October 23, 2006.

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## IX. CONCLUSION

For the reasons set forth above, Appellants request that the Board reverse the outstanding rejections, remand the application to the Examiner, and direct the Examiner to issue a Notice of Allowance.

Respectfully submitted,



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**X. CLAIMS APPENDIX**

**Pending Claims**

1. A method of washing and drying a pin of a microarray spotting instrument, comprising:  
  
moving said pin to a given position;  
  
washing said pin while in said given position by impinging a fluid depositing tip of said pin with at least one stream of wash fluid; and  
  
drying said pin without substantially moving said pin from said given position.
2. The method of Claim 1 wherein moving the pin comprises positioning said pin in a given location in a pin washer/dryer apparatus.
3. The method of Claim 2 wherein said given location comprises a chamber for receiving the pin.
4. The method of Claim 3 wherein said chamber is defined by a tube.
6. The method of Claim 1 wherein said stream velocity is approximately 3 m/sec.
7. The method of Claim 1 wherein multiple streams of wash fluid are directed at the tip of said pin.
8. The method of Claim 7 wherein the streams are directed in a swirling pattern.
9. The method of Claim 1 wherein said position comprises a tube interior, and wherein washing the pin comprises directing a stream of wash fluid at the pin through an aperture in the tube.

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10. The method of Claim 9 further comprising applying a vacuum to the tube to draw wash fluid out of the tube and away from a printhead holding the pin while directing the stream of wash fluid at the pin.

11. The method of Claim 1 wherein drying said pin comprises flowing air past said pin.

12. The method of Claim 11 wherein the air is flowed at a speed greater than 20 m/sec.

13. The method of Claim 11 wherein said position comprises a tube interior, and wherein flowing air comprises applying a vacuum to the tube to draw air through the tube.

14. The method of Claim 1 wherein said tip of said pin includes a slot reservoir for holding sample material to be deposited on a microarray substrate, and wherein washing the pin comprises directing the stream of wash fluid at the slot reservoir.

15. The method of Claim 1 wherein washing the pin comprises impacting said pin with pulsed streams of wash fluid.

16. The method of Claim 15 wherein washing further comprises at least partially drying said pin between applications of said pulsed streams of wash fluid.

17. The method of Claim 1 wherein drying said pin comprises forcing a gas past said pin.

18. The method of Claim 17 wherein said gas comprises air, said air being of lower humidity than air in an enclosure containing the spotting instrument, said air having lower humidity being introduced into said enclosure from outside said enclosure.

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102. A method of washing and drying a pin of a microarray spotting instrument, comprising:

moving said pin to a given position;

washing said pin while in said given position; and

drying said pin without substantially moving said pin from said given position by flowing air past said pin, said air being of lower humidity than air in an enclosure containing the spotting instrument, said air having lower humidity being introduced into said enclosure from outside said enclosure.

103. The method of Claim 102 wherein moving the pin comprises positioning said pin in a given location in a pin washer/dryer apparatus.

104. The method of Claim 103 wherein said given location comprises a chamber for receiving the pin.

105. The method of Claim 104 wherein said chamber is defined by a tube.

106. The method of Claim 102 wherein washing the pin comprises directing at least one stream of wash fluid at the pin.

107. The method of Claim 106 wherein said stream velocity is approximately 3 m/sec.

108. The method of Claim 106 wherein multiple streams of wash fluid are directed at a tip of said pin.

109. The method of Claim 108 wherein the streams are directed in a swirling pattern.



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110. The method of Claim 102 wherein said position comprises a tube interior, and wherein washing the pin comprises directing a stream of wash fluid at the pin through an aperture in the tube.

111. The method of Claim 110 further comprising applying a vacuum to the tube to draw wash fluid out of the tube and away from a printhead holding the pin while directing the stream of wash fluid at the pin.

112. The method of Claim 102 wherein the air is flowed at a speed greater than 20 m/sec.

113. The method of Claim 102 wherein said position comprises a tube interior, and wherein flowing air comprises applying a vacuum to the tube to draw air through the tube.

114. The method of Claim 102 wherein said pin includes a pin tip having a slot reservoir for holding sample material to be deposited on a microarray substrate, and wherein washing the pin comprises directing a stream of wash fluid at the slot reservoir.

115. The method of Claim 102 wherein washing the pin comprises impacting said pin with pulsed streams of wash fluid.

116. The method of Claim 115 wherein washing further comprises at least partially drying said pin between applications of said pulsed streams of wash fluid.

117. The method of Claim 102 wherein drying said pin comprises forcing a gas past said pin.

118. A method of washing and drying a pin of a microarray spotting instrument, comprising:

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moving said pin to a given position;

washing said pin while in said given position with a wash fluid while applying a vacuum to remove wash fluid previously applied to said pin; and

drying said pin without substantially moving said pin from said given position, said pin being dried by applying a vacuum to draw air past said pin.

119. The method of Claim 118 wherein moving the pin comprises positioning said pin in a given location in a pin washer/dryer apparatus.

120. The method of Claim 119 wherein said given location comprises a chamber for receiving the pin.

121. The method of Claim 120 wherein said chamber is defined by a tube.

122. The method of Claim 118 wherein washing the pin comprises directing at least one stream of wash fluid at the pin.

123. The method of Claim 122 wherein said stream velocity is approximately 3 m/sec.

124. The method of Claim 122 wherein multiple streams of wash fluid are directed at a tip of said pin.

125. The method of Claim 124 wherein the streams are directed in a swirling pattern.

126. The method of Claim 118 wherein said position comprises a tube interior, and wherein washing the pin comprises directing a stream of wash fluid at the pin through an aperture in the tube.

127. The method of Claim 118 wherein the air is flowed at a speed greater than 20 m/sec.

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128. The method of Claim 118 wherein said position comprises a tube interior, and wherein the vacuum to draw air is applied to the tube to draw air through the tube.

129. The method of Claim 118 wherein said pin includes a pin tip having a slot reservoir for holding sample material to be deposited on a microarray substrate, and wherein washing the pin comprises directing a stream of wash fluid at the slot reservoir.

130. The method of Claim 118 wherein washing the pin comprises impacting said pin with pulsed streams of wash fluid.

131. The method of Claim 130 wherein washing further comprises at least partially drying said pin between applications of said pulsed streams of wash fluid.

132. The method of Claim 118 wherein the air drawn past said pin is of lower humidity than air in an enclosure containing the spotting instrument.

133. The method of Claim 118 wherein the vacuum applied to draw air past said pin is greater than the vacuum applied to remove wash fluid.

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**XI. EVIDENCE APPENDIX**

None

**XII. RELATED PROCEEDINGS APPENDIX**

None

**FAX TRANSMISSION****DATE:** January 22, 2007**PTO IDENTIFIER:** Application Number 09/586,858-Conf. #8377  
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**Appellants' Brief ( 20 pages)**